

The governing is of the oil-relay type, the control being of the combined throttle and nozzle type.

A 25,000-Kw. machine is installed in the Stuart Street station of the Manchester Corporation Electricity Department, and has been in operation for about three years. Steam consumption tests carried out after twenty-two months' running showed no fall in economy against the first tests carried out fourteen months previously.

## CHAPTER X

### The Ljungstrom Turbine

The Ljungstrom turbine represents a radical departure from general turbine practice, and is characterized by its many original and ingenious mechanical features. This design was invented and developed by two brothers, Messrs. F. and B. Ljungstrom of Stockholm. The more usual

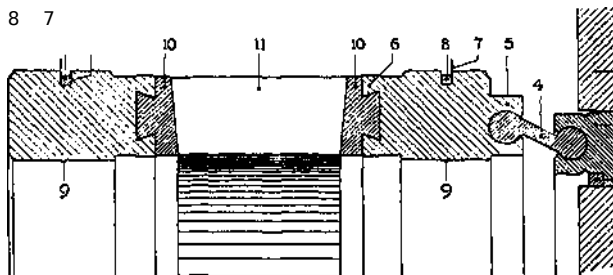


Fig. 38.—Section of Blade Ring

principle of stationary and revolving blade systems is here discarded in favour of two revolving blade systems or rotors rotating in opposite directions. This principle secures the advantage of a relative blade speed equal

to twice that of the actual speed of revolution. Each rotor consists of a shaft

end carrying a disc on the face of which the horizontal blade rings are mounted concentrically. The blade ring spacing is so arranged that the

rings of one rotor fit between those of the other. The blades of the two rotors are set in opposite directions, so that the direction of flow of the steam is reversed in alternate stages.

The steam is admitted to the centre of the blade system and expands radially outwards; in other words, the turbine is of the radial-flow type.

The turbine casing is therefore only subject to the temperature and pressure of the exhaust steam, and does not need to be lagged. This, together with other features of the design, makes it particularly well adapted for utilizing steam at high pressures and temperatures. The Ljungstrom turbine has